DOCUMENT RESUME

ED 400 279 TM 025 543

AUTHOR Newell, Sigrin T.
TITLE Alternative Assessment in Seventh- and Eighth-Grade Science: A Longitudinal Study.
PUB DATE Apr 96
NOTE 28p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, April 8-12, 1996).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Educational Assessment; *Educational Change; Educational Innovation; Interviews; Junior High Schools; Longitudinal Studies; Middle Schools; Program Development; *Science Instruction; *Secondary School Teachers; *Test Construction; *Testing Problems
IDENTIFIERS *Alternative Assessment; *Middle School Students

ABSTRACT

Practicality is the "Achilles heel" of alternative assessment in middle school science. This 5-year study of an "early adopter" school explores factors that enable alternate assessment to thrive in spite of practical problems. Interviews with five seventh-grade life science teachers and five eighth-grade physical science teachers who initiated and continue to sustain new assessment methods indicate that in the early years they explored many approaches, and were not blamed for problems. Since many aspects worked well, the teachers were convinced by their own experience of students' increased ability to understand and explain science concepts. A collegial atmosphere and administrative support in time and resources helped to sustain the innovation. (Contains 3 figures and 12 references.) (Author/SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 400 279

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
SIGRIN T. NEWELL
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC).

Alternative Assessment In Seventh- And Eighth Grade Science:

A Longitudinal Study

Sigrin T. Newell Ph.D.

Walden University

Poster presented at the annual meeting of the

American Educational Research Association,

New York City, April 1996.

TM025543

BEST COPY AVAILABLE

ABSTRACT

Practicality is the Achilles Heel of alternate assessment in middle school science. This five year study of an "early adopter" school explores factors which enable alternate assessment to thrive in spite of practical problems. Interviews of ten seventh and eighth grade teachers who initiated and sustain new assessment methods indicate that in the early years they explored various approaches and were not blamed for problems. Since many aspects worked well, the teachers were convinced by their own experience of students' increased ability to understand and explain science concepts. A collegial atmosphere and administrative support in time and resources helped to sustain the innovation.

For the past five years, middle school teachers in a suburban school in the Northeast have added alternate assessment to the traditional end-of-year exams in their science classes. During this time, staff changes have resulted in the coming and going of three science supervisors, two principals, two assistant superintendents, and two superintendents. Only two of the original six teachers involved are still teaching in the same positions. In spite of personnel changes, the alternate assessment component has remained an important aspect of the final assessment, and in fact has become more effective and more efficient to administer. Alternate assessment techniques are also being increasingly used throughout the school year. This longitudinal case study attempts to clarify the factors which have helped new assessments become firmly established in these two grades.

Across the U.S., reform efforts in science education have included a call to change assessment systems so they will more adequately represent the kinds of thinking students do in inquiry-based science classes (AAAS, 1993; Bybee et. al, 1990). To date there have been few studies which observe the adoption of alternate assessment over a period of years. This school was one of the early adopters of alternate assessment and thus provides a five year perspective.

Implementing and Sustaining Change

The introduction of new modes of assessing students is but one of many reforms in teaching science, mathematics and technology now being implemented. Literature on past reform efforts and current approaches to improving science literacy frames the experiences of one set of teachers in one school. The research and development agenda for alternative

assessment proposed by Champagne and Newell (1992) calls for studies to determine how teachers respond to alternative assessment as an innovation and how implementation of the innovation influences the teachers' classroom practices and understanding of how students learn.

Hargreaves (1996) points to the need for studies of the context in which teachers respond to innovation. Teachers' voices are situated in the school environment they have experienced. Some contexts are supportive and call forth good teaching while other contexts create resistance to innovation. In looking at the reasons for the five year growth trajectory of alternative assessment in the school being studied, we must ask what made this growth possible.

After studying twenty years of innovation in science education, Hall (1992) concludes that effective reforms have seen change as a process, not an event. Hall also believes that change is most effective when all players, from policy makers to practitioners work together on a level playing field to serve the best interests of students.

The Progressive Movement and the NSF sponsored science curriculum of the 1950's and 1960's provide insight into the process of long-term innovation in schools. Elmore (1996) uses these historical movements to develop a model of the ways teachers engage in intentional learning about new ways to teach.

> While knowledge is not deep on the subject, the following seems plausible: teachers are more likely to learn from direct observation of their own practice and trial and error in their own classrooms than they are from abstract descriptions of new teaching; changing teaching practice, even for committed teachers, takes a long time, and several cycles of trial and error; teachers have to feel that there is some compelling reason for them to practice differently, with the best direct evidence being that students learn better; and teachers need feedback from sources they trust about whether students are actually learning what they are taught. (p.24)

Essentially the same conclusions are drawn by Sparks and Loucks-Horsley (1990) following a review of the literature on effective staff development. They add two points: support for collegiality and administrators who "vigorously support" teachers attempts to adopt new practices.

Not every teacher is willing to accept innovation. Johnson, Johnson and Holubec (1988) state that teachers must be at least somewhat dissatisfied with the current practice and be convinced that the new practice will have a desired effect on students. They must also be convinced of the feasibility of the innovation. If these beliefs are not in place, the teachers will believe the cost of changing is too high and will resist the innovation.

Johnston et. al. (1990) reflect on ten years of innovation in the Pittsburgh schools and conclude that sustained support was significant. Change takes time. The amount of time needed can frustrate everyone who desires quick solutions that will garner political support.

In summary, innovation has been sustained in schools where there is an atmosphere of collegiality and innovation, staff support which recognizes teachers as professionals, and a general willingness to spend time and money on the new practice and to accept temporary failures. Perhaps most important, innovation is sustained when teachers are convinced from their own experience that their students are learning more effectively.

Sample and Site Information

Over the five years of this study, I interviewed five seventh-grade life sciences

teachers, and five eighth-grade physical sciences teachers[1]. The school is a medium-sized suburban school with a predominately white middle-class population and a strong tradition of effective science education. Early in the Spring 1991 semester, the middle school science teachers were asked to revise the end-of-year activities for their students and were encouraged to include alternate assessment in this revision. One of the seventh grade teachers had attended a three day workshop to learn the essentials of this approach, so she provided conceptual information to the others. One of the eighth grade teachers has long been an advocate of hands-on teaching and testing. She is the ringleader for the project.

At the two grade levels, various traditional and alternate assessments have been used during the past five years. In general, one-third of the year-end exam is multiple-choice and two-thirds of the questions use alternative modes such as group tasks, open-ended laboratory experiences, extended essays based on data collected by the students, and concept-mapping. Group presentations to the rest of the class are often used as evaluation tools for unit work.

Methods

There are three sources of data for this study: interviews, field notes and document analysis. I attended teacher planning meetings and test days in years one, two, and five and kept field notes. I interviewed the teachers in each of those years and spoke informally to them in years three and four. Copies of the assessments themselves, and an article written by one of the teachers are the third source of data. Documents such as these track changes made

---

[1] To honor the teachers' work, I asked each teacher if they preferred that I use their own name or a pseudonym. Thus, real names and pseudonyms are intermingled.

over the years.

I transcribed the interviews and field notes and coded them using the constant comparative method (Strauss & Corbin, 1990). Using the codes, I constructed two conceptually-clustered matrices (Miles & Huberman, 1984) (Figures 1a,1b,2a,2b). On such a matrix, three kinds of entries are made. A label captures in a single word each informants' characteristic response. An explanation elaborates on the label where necessary. A quotation captures the essence of a person's thought and adds richness to the picture. I added a fourth element, a level of use label, drawn from the work of Hall (1992). Hall defines eight levels of use of an innovation from non-use to renewal (Figure 3). I assigned a level to each of the teachers I interviewed. These levels enhanced comparison of the matrices between the first and fifth years.

After constructing the matrix, I was able to get an overview of a large amount of data. Patterns and directions of movement emerge. By reading rows, I could get a picture of an individual's responses to several issues. By reading columns, it is possible to compare teachers' responses.

Results and Discussion

A. Changes over five years

The conceptually-clustered matrices, field notes and copies of the assessment questions all augment the impression of gradual growth over the five years. New teachers who were hired were selected, in part, because of a willingness to experiment. Each of them, in the interviews, credits the experienced teachers with showing them how to conduct effective assessments and supporting their early attempts. Thus, the matrices for 1995 (Figure 2) show

that all six teachers are at the top three levels of integration. Although they still struggle with logistics, all are convinced that the benefits in increased student learning are worth the cost.

Although multiple choice exams continue to be given, questions in year five called for more higher level thinking. For example, seventh graders are asked to construct their own taxonomic key and then use it to answer multiple choice questions. The eighth grade assessment has a laboratory practical component with seven stations and materials that the students must manipulate (Cappiello, 1994). Over the five years, the activities at the stations have been changed so that it is more efficient to set up and administer. For example, in the early years, batteries burned out or things broke before all students had a chance to work with them. A question dealing with the differing densities of oil, water and alcohol created a gloppy mess,after the first few rotations. Experience has helped the eighth grade teachers avoid such problems.

Another way in which the eight grade assessment has changed is that more of the laboratory questions are open-ended. For example, students are asked to record the masses of several objects and the forces needed to drag them up an inclined plane. They must design a data table to record their results and then explain the results in terms of mass, friction and force. Another station provides students with a variety of toys, watches and rulers and asks them to devise and solve their own problem (Cappiello, 1994).

The one assessment that has changed the least is the seventh grade group-work exam. This is unfortunate because it has never worked well. Groups of students are presented with a scenario of scientists trying to decide if acid rain effects the growth of plants. Each group is given three plants, A, B, and C. A has a large amount of acid in the soil, B has a small

BEST COPY AVAILABLE

amount and C is the control. Students are to measure stems and leaves, create a data table and bar graph and then to explain their response to the question, "Did the acid make a difference"? The problem is that the pea or bean seedlings need to be started several weeks beforehand. Either the plants get a late start, or they dry up over the weekend, or they collapse after the first group of seventh graders measures them. The teachers like the group-work aspect of this problem, but they have never managed the logistics of growing the plants. Each year they plan carefully to avoid the problem of the preceding year, only to encounter a different problem. Ms. Wood explained that almost all available examples of alternate assessment are for physical sciences. And none of the seventh grade teachers has had the time to step back and design a different group-work problem to replace this one.

B. Factors that discourage sustained adoption

In year five, just as in year one, the teachers were concerned about the practicality of alternate assessment. These concerns focused on three issues: time for preparation, administration and scoring; space to set up the assessment; and adequate resources to conduct the tests they designed. Of these, time was the predominant concern[2].

> It's so hectic in terms of teaching five classes, monitoring a study hall, meeting with guidance, parent conferences etc....You can't just stop and say, okay, now I'm going to take time to figure this out. [Ms. Quackenbush, 11/20/91]

> The toughest part is for us to get together to meet and plan it.... That's probably the biggest problem. [Ms. Cappiello, 11/25/91]

Planning the assessment is only one aspect of the time needed. Getting out all the equipment for the hands-on activity and setting it up and then putting it away again takes

---

[2] Quotations have been minimally edited for readibility.

uncounted hours. Janitors, school staff and I all lent a hand. Without this extra help, the assessment would have been impossible. After the exam, scoring took time:

> The correcting took over eighteen hours. Some of it was done while the students were being entertained by the other teachers at a field day at the town park and the rest of it was, as usual, at home, at night. [Ms. Quackenbush, 11/20/91]

Patience is another aspect of time that is essential for effective use of alternate assessment. The only way to find out how an assessment works is to give it to students and see how they respond. It may take several iterations to get the question to work the way the designer intends.

> You have to try it with the kids. They may come up with fantastic insights...or they may interpret it totally differently than what you intended. [Ms. Wood, 3/2/96]

Administrators and policy makers who want quick, visible results are sure to be frustrated by the amount of time it takes to get the results they envision.

Space is also an issue. In this school, there is an exam week in which classes are suspended. Students only come for the hours in which their own tests are scheduled. This means that there are empty rooms that the alternate assessment can spread into. The gymnasium and extra classrooms were used to accommodate this need. It is much more difficult to find space for ongoing assessments throughout the year:

> I have so many kids in this classroom. All of the desks are filled. I have such limited space. I tried the first test to do lab stations. It was a fiasco, completely! There was no room...It was hazardous... I was crushed. [Ms. Poodiack, 11/20/91]

Alternate assessment is resource intensive. Someone has to purchase requisite quantities of tin foil, paper cups, eye droppers, mass balances, graph paper etc. etc. Money must be in the budget to pay for the materials, there must be a place to store them; there must

be a plan to replace expedibles and to repair classroom equipment. Some districts have resource centers that supply kits to teachers, other districts have an account at the local hardware store. Whatever the solution, the resource issue is a major practical problem which must be addressed.

My field notes for 1992 reveal another practical concern. To work effectively, wide-scale alternate assessment requires a great deal of good will within the school staff. In this school, the gym teachers vacate the gym on assessment day so the laboratory stations can be set up, janitors help move furniture and have more to clean up than usual, and other teachers pitch in to help in various ways. In 1992, the school was having a union dispute and everyone was on work-to-rule. Good will was not present in the school, and the fledgling alternate assessment program almost didn't survive. Three teachers told me privately that they were so exasperated with logistical problems, they'd never do alternate assessment again. Fortunately, the next year good will was re-established. Intangible issues of tone and mood affect a school's ability to sustain innovation and need to be taken seriously.

C. Factors which encourage sustained adoption

By fifth year, every teacher interviewed had no doubt that the benefits of alternate assessment outweighed the practical problems. Four factors were consistently mentioned to explain this belief.

Dissatisfaction with the status quo. Teachers in this sample expressed dissatisfaction with conventional means of testing in two ways. Several spoke of their frustration when students memorize material only for the duration of the testing period. Others implied their

dissatisfaction by speaking of their vision of how things ought to be:

> If I'm going to fill their heads with a lot of memorized facts, how much are they going to remember? A lot of that stuff I don't even remember. My goal is to give them the concepts, ideas.... The detail - give them the opportunity to look that up in references. [Ms. Cappiello, 11/25/91]

> You can only give them recall tests and assault their self esteem so often before they just kind of give up and don't even want to try. So I think some of these kids will be pleasantly surprised when they get their tests back and feel good about themselves. [Ms. Quackenbush, 11/20/91]

The teacher who had the most doubts about alternate assessment was the one who appeared least dissatisfied with conventional testing:

> I think the bottom line is basic knowledge and being able to apply it. Some of the problems -- you did have to apply some knowledge, but I think a lot of the questions were very open-ended and there wasn't much direction and I think there's a lot of direction in science. So I just hope that people don't try to make it 100% alternative type of situation. [Mr. Patton, 6/18/71]

Belief that alternate assessment will help student learning. Alternate assessment provides a great deal of intrinsic satisfaction to teachers who see students respond positively:

> But I would say, for the majority of the kids, it's good. They need to be trained, this is new for them, They need to learn how to do this. They need to learn what their responsibilities are as part of the group. [Ms. Feldman, 11/12/91]

> Still, we can't forget that there's got to be some joy and some -- it's got to be a fluid thing, learning. I think one of our big jobs in the middle school it to get kids excited about learning. If we turn them off now, that's too bad. [Ms. Bosworth, 12/10/91]

Each of the teachers independently commented that one of the major benefits of alternate assessment is that students with a wider variety of abilities and learning styles can experience success.

BEST COPY AVAILABLE

> I was afraid that all my enriched kids would get 100 and everybody else would fail... But I had kids in the classes that were not enriched that... a couple got hundreds and there was a nice spread... It could be real nice for them to realize, hey, you weren't in the enriched class but you did better than some of the kids who were and you took the same test. [Mrs. Quackenbush, 11/20/91]

When asked during an interview what recommendations they would have for schools considering adopting this mode of teaching, several teachers mentioned the benefits of hearing other teachers' enthusiasm:

> I think when you get into a program you need to teach your staff -- to give your staff a chance to go out to schools where it's being used, where you can see how successful it is, where you can hear all the teachers' excitement and just feel it. Then you will buy into it because you're a teacher, because you care about kids. [Ms. Brown, 12/10/91]

Collegial school climate. The matrices offer only a sample - the original interviews are infused with appreciation for the ability to work together as colleagues.

> All the teachers on my team are dynamic. They are constantly trying to find better ways to make sure kids really learn. Since our rooms are close together, we frequently chat in the halls. I find that very helpful. [Ms. Wood, 4/3/96]

The eighth grade teachers negotiated with the administration to arrange their schedules so they are all free at the same hour, thus enabling common planning time. The seventh grade teachers would like to make a similar arrangement.

In the first two years, Mr. Patton, who was most dubious about the benefits of alternate assessment expressed his concern in a way that was positive and that could be heard by the other teachers. They took his objections into account and devised a test which had a stronger academic content. Having had his major fears allayed, Mr. Patton participated willingly in the new assessment. By taking his legitimate concerns seriously, the others made

him into an ally rather than a resistor. After Mr. Patton moved to the high school in the same district, Ms. Cappiello said, "I really miss him. He kept me honest. He kept me focused on science."

Flexibility and acceptance of teachers' professional decisions. It is a commonplace in psychology that before people can take a risk, they must be assured that the costs of failure are not too high. When the administrators established the goal of instituting alternate assessment, but left the design decisions to the teachers, they enabled the teachers to change plans as needed to make the assessments go smoothly.

In the first year, the teachers did some interesting things to create the necessary sense of security. The assessment was counted as a unit test rather than as a final exam. That way, if there was something seriously wrong with the assessment itself, the students would not be overly penalized for a poor score.

A pattern, initiated at the beginning, and sustained over the years is that there is a common core of questions, but each teacher adds a few questions that are specific to material that they have emphasized. The tailor-made test allows for teacher individuality and frees them from "teaching to the test". [Field notes, 6/11/91, 3/6/96]

The hands-on assessment taken by the eighth graders has ten questions but only eight are counted. The lowest two scores are dropped. During the exam, some equipment invariably creates problems. Scores for those stations can be discarded. In the seventh grade, cooperative groups work together on the exercise. They are allowed to ask their teachers process questions during the test. This assures the students and the teachers that there would be no failures caused by lack of understanding what is expected of them. These design

decisions by the teachers do a great deal to allay anxieties about this new way of evaluating learning. [Field notes, 6/11/91, 3/6/96]

Flexibility and patience on the part of the supervisors and the principal are also credited by the teachers as important factor enabling them to take risks.

> If you fail, the administrators don't blame you. They say, "This is being tried, and if it doesn't work 100%, that's to be expected." [Ms. Bosworth, 3/6/96]

Another example of flexibility is that the seventh and eighth grade teachers are encouraged to use very different styles of alternate assessment. These are in tune with developmental differences in the students and with the different nature of the content in life and physical sciences.

Conclusion

Elmore (1996) says his list of factors enabling teachers to learn about new ways of teaching "seems plausible". Elmore's suggestions are and those of Sparks and Loucks-Horsley (1990) are supported by the experience of the ten teachers in this study. Over five years, the teachers learned through trial and error in their own classrooms and through rich collegial interactions. Administrators allowed time for adoption and vigorous support for the innovation. The reason to adopt alternate assessment which all the teachers find most compelling is the experience that their students are becoming more articulate in conveying a deep understanding of the science being taught.

Practicality is the Achilles' heel of alternate assessment. "Trying to fix the airplane while it's in the air" is a good metaphor for the problems. Introducing effective new assessment modes will take large quantities of the two commodities which are scarcest in schools: time and money for staff support. Exhortation and mandates will not make alternate

assessment spring full-blown into American schools. Teachers who are committed to better learning outcomes for their students are intrigued by the potential of these new techniques. But judging from the experiences of these teachers, resolving practical issues is the key to long term implementation of alternate assessment.

Recommendations

As more states consider implementing alternate assessment on a large scale, two ideas from this study are worth considering. Because it takes so much time to develop and revise alternate approaches, there should be some central repository of "tried and true" assessments. Perhaps the National Science Teachers Association or some other group could establish a web site. There is a particular need for successful approaches to assessing the life sciences. When teachers do create an effective question or task, they could post it on the web site.

The conventional way of disseminating new approaches has been to hold workshops for teachers. In view of the importance of appropriate administrative support, it may be important to plan wide-scale workshops designed especially for administrators in which they share successful strategies for supporting the teachers in their schools who are implementing alternate assessment.

References

American Association for the Advancement of Science, (1993). Benchmarks for Science Literacy, Washington DC: Author.

Bybee,R.W., Champagne, A.B., Loucks-Horsley, S. Raizen, S.A. & Kuerbis, P.J. (1990). Assessment in science education: The middle years. Washington DC: The National Center for Improving Science Education.

Cappiello, J. (1994, Fall). Alternative assessment in middle school science. The Science Teachers Bulletin, 58(1), 9-11.

Champagne, A., & Newell. S.T.,. (1992). Directions for research and development: Alternative Methods of Assessing Scientific Literacy. Journal of Research in Science Teaching, 29(8), 841-860.

Elmore, R. (1996, Spring). Getting to scale with good educational practice . Harvard Educational Review, 66(1), 1-26.

Hall, G. (1992, October). The local educational change process and policy implementation. Journal of Research in Science Teaching, 29(8), 877-904.

Hargreaves, A. (1996). Revisiting Voice. Educational Researcher, 25(1), 12-19.

Johnson, D., Johnson, R., & Holubec, E. (1988). Advanced Cooperative Learning. Edina MN: Interaction Book Co.

Johnston, J., Bickel, W., & Wallace Jr., R. (1990, May). Building and sustaining change in the culture of secondary schooling. Educational Leadership, 48(9), 46-48.

Miles, M., & Huberman, A. (1984). Qualitative Data Analysis. Newbury Park CA: Sage.

Sparks, D., & Loucks-Horsley, S. (1990). Models of staff development. In W. Houston (Ed.), Handbook of Research on Teacher Education (pp. 234-250). New York: Macmillan.

Strauss, A., & Corbin, J. (1990). Basics of Qualitative Research: Grounded theory procedures and techniques. Newbury Park CA: Sage.

Figure 1a

Overview of Approaches to Alternative Assessment
1990

7th Grade	Initial Attitude Toward A.A.	Level of Dissatisfaction with Conventional Testing	Belief in Positive Effects of A.A.	Perception of Practicality of A.A.	Perception of Costs of Change
Ms. Quakenbush **(Mechanical)**	(Attended Workshop) *Very Positive* **Ringleader** "It teaches them what they've got to do throughout the year."	*Medium* "You can only give them recall tests so often and assault their self esteem before they give up."	*High* "They are data gathering and collecting and organizing...They are shown at each step a good example. That's what A.A. is."	*Concerned* "It's nice to do all these new things, but if you're not given any time to learn it, or plan it, it becomes more difficult."	*Concerned* "It's like trying to fix the airplane while you're flying it."
Ms. Bosworth **(Routine)**	*Positive* (sees two sides) **Follower** "The thing I like about it was actually watching the kids work together."	*Medium* "We don't want to be teaching to the test all year...50% should be adapted to the learning of the child at that moment."	*Medium* "We really had, for the first time as a department, to work together to create a product."	*Concerned* "If you don't give planning time to your staff, then you're shoving it down their throats and they feel resentful."	*Dubious* "I don't understand A.A. I don't understand why every few years they come along and say, 'Nope, you're doing it wrong. Change it.'"
Ms. Feldman **(Mechanical)**	*Positive* **Follower** "I know if I did it more, my teaching would be better. I just haven't been able to find the time."	*Medium* Did not discuss dissatisfaction.	*Medium* "I'm doing more practical...more hands on...more cooperative testing than before."	*Concerned* "It's going to take a long time to make the transition...The kids need to learn how to do this." "I don't get any support."	*Dubious* "The difficulty of the student who chooses not to be an active participant...helping those kids adjust to this kind of testing...takes time and effort.

BEST COPY AVAILABLE

Figure 1b

Overview of Approaches to Alternative Assessment
1990

8th Grade	Initial Attitude Toward A.A.	Level of Dissatisfaction with Conventional Testing	Belief in Positive Effects of A.A.	Perception of Practicality of A.A.	Perception of Costs of Change
Ms. Cappiello **(Refinement)**	***Very Positive*** **Ringleader** "You can always be creative. I'm always trying something new."	***High*** "If I fill their heads with facts, how much are they going to remember?"	***High*** "I guess my whole orientation to testing and viewing things is beginning to change."	***Convinced*** "In class A.A. works well." ***Concerned*** "Coordination of whole grade A.A. is difficult. Kids are on top of each other. Numbers and equipment are a real problem."	***Concerned*** "You need to give to give teachers real time to plan it. By the end of the day you're exhausted. I was under the impression we'd be given ½ day for planning.
Mr. Patton **(Mechanical)**	***Dubious*** Uses doubts effectively to keep others focused on academic outcomes. "Bottom line is, they do have to be accountable for knowledge."	***Medium to Low*** "I wouldn't want to forfeit the conventional half of the test."	***Low but Changing*** Another teacher says: "I've seen this person turn 180° , a real change from my perspective."	***Changing*** "I noticed it took the pressure off. Maybe it will change their attitude a little bit."	***Very Dubious*** "This is just the newest fad. It isn't going to last because it doesn't work real well in schools. I'm not sure the ends justify the means."
Ms. Poodiack **(Mechanical)**	***Positive*** **Eager Follower** "I make my kids explain it to me as if I were five years old. If they can do that, they understand it."	***High*** "We don't want them sitting there like the olden days where we just stood there and talked like a big professor."	***High*** "This year I want to focus on making sense of hands-on tasks. I want them to understand what they are doing and why they are doing it."	***Worried*** "I tried the first test...it was a fiasco. There was no room. It was hazardous. This room is so small."	***Less Concerned*** I'm sure this year I'll have a lot better input as far as better ways of putting the test together. I'm going to be a lot more confident."

Figure 2a

Overview of Approaches to Alternative Assessment
1995

7th Grade	Initial Attitude Toward A.A.	Level of Dissatisfaction with Conventional Testing	Belief in Positive Effects of A.A.	Perception of Practicality of A.A.	Perception of Costs of Change	Explanation of Success
Ms. Bosworth **(Integration)**	***Positive*** **Ringleader** "With 12- and 13-year-olds, if you don't get them involved, you tend to lose them."	***Conflicted*** "I feel guilty...I'm weak in conventional testing and the kids need the experience. It's easier to correct but I'd rather have the kids explain."	***High*** "When students can express themselves, share ideas and effortlessly explain, when a kid can back up and talk about something he did two months ago, I find that's happening more and more. It's a real joy to me."	***Realistic*** "It all boils down to practicality. If I had too many preps or had to share a class-room, I couldn't do it. It depends on space, money, who you hire. Your have to hire some-one with imagination, who's willing to try something and not be intimidated by failure at the beginning."	***Benefits outweigh Costs*** "It's a necessity to achieve success with this level child." "What we need now is more time to get together on a curriculum grade level that builds strength."	***Positive Climate Sustained Support*** "It really helps when administrators can share the joy that you experience when you succeed, or help you wade through something when it's difficult."
Mr. Gill **(Integration)**	***Open to Learning More*** **Eager Follower** "I didn't initially understand the premises and am still not sure I understand completely what kind of alternatives are available."	***Mix and Match*** "I work to achieve a balance of essay, multiple choice, and performance tasks. I just wrote a test where they construct their own taxonomic key. When they use their key, the answers are multiple choice."	***High*** "There's a wider range of success possibilities for the students. The students of lowest ability are sometimes more successful at concept mapping. It really tests students' understanding."	***Realistic*** "Where I can use it effectively, I like it better, but I'm not always able to come up with good assessing techniques."	***Benefits outweigh Costs*** "Time is the major cost -- to develop and score them -- we get a better view of student understanding. Students of all learning styles can express what they know."	***Collegial Support Administrative Support*** "Our department consists of individuals who want to do this. The administration feels it should be done, but how we do it is up to us."
Ms. Wood **(Renewal)**	***Positive*** **Eager Follower** "When I started teaching, I did it without knowing it, it just seemed right to me."	***High*** "Teacher's guides aren't much help. They only have multiple choice questions."	***High*** "The benefits are being able to see whether kids really understand. It's also more fun and less stressful for the kids."	***Realistic*** "Developing life science questions is difficult -- all the examples are physical science. I'm always revamping my questions."	***Benefits outweigh Costs*** "Costs are time, space, equipment. I'm going journals, since I share a room, I have to carry them to the 3rd floor to read them."	***Helpful Supervision Collegial Support*** "Our rooms are close together -- we constantly share ideas. The supervisor is always making suggestions."

BEST COPY AVAILABLE

Figure 2b

Overview of Approaches to Alternative Assessment
1995

8th Grade	Initial Attitude Toward A.A.	Level of Dissatisfaction with Conventional Testing	Belief in Positive Effects of A.A.	Perception of Practicality of A.A.	Perception of Costs of Change	Explanation of Success
Ms. Capiello **(Renewal)**	***Very Positive*** **Ringleader** "Over time I've be-come more thoughtful. Are there better assessment alternatives that will enable students to learn?"	***Dissatisfied*** "Multiple choice tests are a waste of time. I haven't given one in years. Now I'm wondering how to get rid of paper and pencil tests."	***High*** "Kids who do not like to write thrive when given the opportunity to show what they know in other ways. I've tried presentations and giving them the chance to build things. I still have to work on concept mapping.	***Convinced*** "You can do it. It just depends on what your priorities are. To make time, don't teach as many facts. I hate the word 'cover.'"	***None*** "I don't see any costs. It's what you build into it."	***Administrative Support*** "Our administration is ahead of many teachers in knowing what's out there. They've hired creative committed teachers and an enthusiastic supervisor. They allow for individual variation."
Ms. White **(Integration)**	***Positive*** "Wow, there are actually other teachers who break out of the mold. I've had a chance to do a lot of assessment and I've grown positively: the 8th grade teachers plan so some parts are common and some are specific to our classrooms."	***Dissatisfied*** "I've never like multiple choice. The students say, 'Oh, but multiple choice is so much easier."	***High*** "If you're asking the right questions, you actually see whether the kids have gotten the whole process idea or the whole concept. A.A. is more concrete. At this developmental stage, they need to have something concrete."	***Realistic*** "The logistics bog you down; especially trying to make it fit into a 40 minute period. No matter how good your rubric, you still have to read through and think about what they wrote."	***Benefits outweigh Costs*** "The big drawback is lack of time. But A.A. gets students to think. I can go back and re-teach when I discover misconceptions."	***Collegial Support*** "Nobody comes up and says, 'You're just making work for yourself.' Science is very visible in this school, we don't stay within the confines of our rooms." ***Administrative Support*** "The administrators love to pop in and say, 'Oh my gosh, what are you doing now?'"
Mr. Tyler **(Refinement/ Integration)**	***Started with A.A.*** **Advocate** "It's the only way I've every known. It's my philosophy."	***Mix and Match*** "Students need practice with multiple choice to get ready for high school. I always have at least half labs or demonstrations. I mix it up to test at different interest and skill levels."	***High*** "New assessments motivate students, are more applicable to real world problems and various learning styles. I really can find out what the students know."	***Realistic*** "Things which seem difficult to set up at first get easier over time. You have to teach the students how to deal with these assessments. I never sit down; I have to really manage the exam."	***Benefits outweigh Costs*** "Costs are time, money, organization. Time for preparation and scoring is essential."	***Collegial Support*** "My co-teachers showed me how it's done. I give our supervisor total credit. He allows and encourages us to try new things."

BEST COPY AVAILABLE

LEVEL OF USE		BEHAVIORAL INDICES OF LEVEL
VI	RENEWAL	THE USER IS SEEKING MORE EFFECTIVE ALTERNATIVES TO THE ESTABLISHED USE OF THE INNOVATION.
V	INTEGRATION	THE USER IS MAKING DELIBERATE EFFORTS TO CORRDINATE WITH OTHERS IN USING THE INNOVATION.
IVB	REFINEMENT	THE USER IS MAKING CHANGES TO INCREASE OUTCOMES.
IVA	ROUTINE	THE USER IS MAKING FEW OR NO CHANGES AND HAS AN ESTABLISHED PATTERN OF USE.
III	MECHANICAL USE	THE USER IS USING THE INNOVATION IN A POORLY COORDINATED MANNER AND IS MAKING USER-ORIENTED CHANGES.
II	PREPARATION	THE PERSON IS PREPARING TO USE THE INNOVATION.
I	ORIENTATION	THE PERSON IS SEEKING OUT INFORMATION ABOUT THE INNOVATION.
0	NONUSE	NO ACTION IS BEING TAKEN WITH RESPECT TO THE INNOVATION.

Figure 3: Levels of use of the innovation: Typical behaviors (Hall, 1992)

References

American Association for the Advancement of Science, (1993). Benchmarks for Science Literacy, Washington DC: Author.

Bybee,R.W., Champagne, A.B., Loucks-Horsley, S. Raizen, S.A. & Kuerbis, P.J. (1990). Assessment in science education: The middle years. Washington DC: The National Center for Improving Science Education.

Cappiello, J. (1994, Fall). Alternative assessment in middle school science. The Science Teachers Bulletin, 58(1), 9-11.

Champagne, A., & Newell. S.T.,. (1992). Directions for research and development: Alternative Methods of Assessing Scientific Literacy. Journal of Research in Science Teaching, 29(8), 841-860.

Elmore, R. (1996, Spring). Getting to scale with good educational practice . Harvard Educational Review, 66(1), 1-26.

Hall, G. (1992, October). The local educational change process and policy implementation. Journal of Research in Science Teaching, 29(8), 877-904.

Hargreaves, A. (1996). Revisiting Voice. Educational Researcher, 25(1), 12-19.

Johnson, D., Johnson, R., & Holubec, E. (1988). Advanced Cooperative Learning. Edina MN: Interaction Book Co.

Johnston, J., Bickel, W., & Wallace Jr., R. (1990, May). Building and sustaining change in the culture of secondary schooling. Educational Leadership, 48(9), 46-48.

Miles, M., & Huberman, A. (1984). Qualitative Data Analysis. Newbury Park CA: Sage.

Sparks, D., & Loucks-Horsley, S. (1990). Models of staff development. In W. Houston (Ed.), Handbook of Research on Teacher Education (pp. 234-250). New York: Macmillan.

Strauss, A., & Corbin, J. (1990). Basics of Qualitative Research: Grounded theory procedures and techniques. Newbury Park CA: Sage.